



Clinical and Haematological Study of *Hijama-Bi'l-Shart* (Wet Cupping) In the Management of Pain

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Abstract

Background: This randomized clinical and haematological study evaluated the effect of *Hijama-Bil-Shart* (Wet Cupping) on musculoskeletal pain and inflammatory markers in venous and cupped blood.

Materials and Methods: 110 patients with musculoskeletal pain were screened, with 90 diagnosed and included. After 30 subjects were lost to follow-up, 60 completed the study. Participants received 4 weekly sessions of wet cupping therapy over 4 weeks. Pain intensity was measured using VAS and KOOS scores, and inflammatory markers (Serum uric acid & CRP) were assessed in venous and cupped blood.

Results: Pain relief, measured by VAS, showed significant improvement across various musculoskeletal conditions: cervical spondylosis, frozen shoulder, low backache, sciatic pain, knee osteoarthritis, gout, and rheumatoid arthritis. KOOS scores for knee osteoarthritis improved significantly. Serum uric acid levels in venous blood were suggestively insignificant, while CRP levels decreased gradually but were not statistically significant. No adverse effects were reported.

Conclusion: *Hijama-Bil-Shart* (wet cupping) therapy is effective in relieving musculoskeletal pain and improving quality of life. It shows long-term benefits with sustained pain relief and gradual reduction in CRP levels. However, it is not effective in significantly reducing raised serum uric acid levels.

Keywords: Musculoskeletal pain, Wet cupping, VAS, KOOS, *Hijama-Bil-Shart*, CRP

1. INTRODUCTION

The International Association for the Study of Pain defines pain as "an unpleasant sensory and emotional experience which is associated with or resembling actual or potential tissue damage".¹ It is a major symptom in many medical conditions and can interfere with the daily life activities of a person and the general functioning of the body.⁵ In the literature of *Unani* medicine, the term 'pain' is expressed as "*Waja*" which is an Arabic word. It is perceived by *Unani* scholars as a perspective on inconvenience in the body achieved by the deranged physiology of psych or soma. *Ibn Sina* (980-1037 AD) expressed that 'joy or bliss' is the *Ahsase Musbat* (Pleasant feeling) and '*Waja*' is the *Ahsase-Manfi* (Unpleasant sensation). In short, the charming effect is known as *lazzat* (bliss) and the terrible effect is "*waja*".^{1,2,3} Today, it is acknowledged that continuous pain necessitates a pathologic reorganization of the neural system.⁹ This process can be due to several factors, such as genetic predisposition,^{10,11} central sensitization mechanisms,¹² and many other factors, which are at the core of the study of the etiology of pathologic pain conditions.¹³

The Etiopathogenesis (*Asbab wa Mahiyat-e-Marzi*) of *Waja* as per Avicenna, any unexpected changes in the demeanor (*Sue Mizaj Mukhtalif*) or a break in the coherence (*Tafarruqe Ittesal*) impact the state of being any organ administering to

distress. *Rehi madda* (Gaseous substance) may also produce discontinuity (*Tafarruqe ittesal*) in two ways either by a restricted gathering of *Rehi madda* (Gaseous substance) which produces distension in the organ pit, for instance; *Nafkhatul maida* causes break in the internal surface of an organ or it may produce *tafarruqe ittesal* by piercing of *Rehi madda* (Gaseous substance) in the organ's layers. The *ghaleez mawad* (Vitiated matter) causes a break in the continuity either by their excess measure of unpleasant/vitiated matter. Quantitatively vitiated humors cause strain or stress while emotionally they produce irritation or ulceration in the organs and again together cause torment or distress.¹⁴ There are several classical terms for *Waja* (pain) have been mentioned in the *Unani* literature based on the site of pain involved such as *Waja' ur rakba* (Knee joint pain),¹⁵ *Irqunnasa* (Sciatic pain); *Niqras* (Gouty pain); *Waja' uz zahr* (Low Back Pain).^{15,16} The Classification of *Waja* (Pain) in modern and *Unani* may correlate as in *Unani* literature, *Safra* and *Dam* predominance /derangement cause *Waja-e-haad* (acute pain), whereas *Sauda* and *Balgham* cause *Waja-e-muzmin* (chronic pain). *Waja 'Hakak* (pruritic pain) is a type of superficial somatic pain, whereas *Waja' Mufassikh* (muscle pain) and *Waja' Rakho* (dull pain) are both types of deep somatic pain. In *Unani*, *tashkhees* of '*Waja*' are based on *Sue Mizaj* (Altered temperament) and *Tafarruqe Ittesal* (breach of continuity), which could be *Sada* or *Maddi*, and can be used to perform the analysis. *Sue*

mizaj sada may be considered if the onset of symptoms is continuous against exposure to cold or warmth, whereas *Sue mizaj maddi* may be considered if the humoral inequilibrium quantitatively is the case.^{17, 18, 19}

Due to the higher incidence of patients with different musculoskeletal pain conditions in society, the researchers of various systems of medicine are concentrating on developing a safe and effective mode of treatment for its management. Different types of anti-inflammatory and analgesic drugs have been introduced into mainstream medicine for symptomatic relief in patients suffering from pain distress, such as aspirin, ibuprofen, acetaminophen (NSAIDs), etc.

However, these drugs have been reported to produce adverse drug reactions in different systems of the body like GIT, Hepato-biliary, and renal systems. So, if we have a mode of treatment that offers efficacy without having an extent of harm to the body, shall be appreciable and should be taken as the treatment of choice, and if the treatment is possible without administering the drug then such a method should be given the top priority for the management of painful musculoskeletal conditions. In the *Unani* system of medicine, there are three modes of treatment, i.e. *Ilaj-bil-Tadbeer* (Regimenal Therapy), *Ilaj-bil-Dawa* (Pharmacotherapy), *Ilaj-bil-Yad* (Surgery). The great advantage of *Ilaj-bil-Tadbeer* is that it is almost impossible to cause any side effects if carried out as per recommended rules and regulations. *Hijama* (Wet Cupping) is one of the *Tadbeer* (regimen), which has been practiced for many diseased conditions since ancient times. It has scientific justification in the light of humoral theory, that it brings humoral equilibrium and thus restores health. Later this concept seemingly gave rise to '*istifragh*' and '*imala*'. Though the clinical efficacy of *Hijama* is beyond doubt, as the treatment has been successfully used for long, however scientific studies must be carried out on this method and scientific data must be provided to validate the effectiveness of the regimen. Therefore it has been felt necessary to carry out a study using modern parameters to objectively assess the utility of this method in patients having musculoskeletal pain in different conditions such as Cervical spondylosis (*Waja-al-Unuq*), Frozen shoulder (*Waja-ul-Kataf*), Low backache (*Waja-al-zahr*), Knee pain (*Waja-ul-Rakba*), etc. Keeping in view the above consideration, the present study has been designed to evaluate the clinical and hematological efficacy of *Hijama bil shurt* (Wet Cupping) in the management of musculoskeletal painful conditions (*Waja-al-mafasil*). The enrolled patients were assessed as per the assessment parameters and values were recorded before starting treatment, at each visit, and after completion of the treatment. *Hijama bil Shurt* was done weekly for 4 weeks, with four sittings done up to 28 days. The total duration of the study was 28 days. The clinical assessment of the treatment was made based on the VAS (10 points on Likert's Scale) and KOOS Score and the hematological assessment was made based on Haemoglobin level, CRP, and Serum uric acid, before and after each sitting of *Hijama* (Wet Cupping). The logical approach of the *Unani* system of medicine towards pain management and the ancient glory of successful practice of *Hijama* (Wet Cupping), made a strong basis to expect a good possible outcome of this study. The present study was planned with the aim of Scientific validation of *Hijama-Bil-Shurt* (wet cupping) in the management of painful musculoskeletal conditions based on VAS & KOOS and to assess the inflammatory marker (CRP & S. Uric acid) in cup blood and venous blood among painful musculoskeletal condition.

2. METHODS

2.1. Study design and participants

After obtaining approval of protocol from the Institutional Ethics Committee for Biomedical Research of Ajmal Khan Tibbiya College & hospital, Faculty of *Unani* Medicine, AMU, Aligarh, India vide no. 340/FUM This study was registered in the clinical trial registry of India vide no. CTRI/2022/11/046982. Informed written consent was obtained from all participating individuals on recruitment. The trial was conducted at the department of *Ilaj Bit Tadbeer*, Faculty of *Unani* Medicine, Aligarh Muslim University, Aligarh, Uttar Pradesh India between March 2021 to August 2022. Patients from the OPD & IPD of the Ajmal Khan Tibbiya hospital were enrolled in the trial. This was an Interventional open-labeled Observational Study, conducted to test the role of *Hijama-Bil-Shurt* (wet cupping) in reducing pain among different musculoskeletal ailments. Subjects of either sex, 20–50 years of age complaining of musculoskeletal pain (*Waja*), irrespective of its etiology, based on primary outcome measure VAS & KOOS score, along with their *Mizaj* assessment were included after obtaining informed written consent and were individual, questioned for a detailed history of the disease. The clinical features, history, and investigations of the enrolled patients were recorded in the prescribed case report form. The patients were clinically examined and their hematological, biochemical, and radiological investigations were carried out. Subjects with a recent history of trauma or fracture of a bone, Systemic diseases (e.g. Diabetes) or H/o cardiovascular disease & blood-borne infections, Pregnancy & Lactation, Patients having bleeding disorders, Patients on anti-coagulant and anti-platelet- therapy were not included in the study. After enrollment clinical evaluation was done by the complaint of patients for different musculoskeletal disorders like Cervical Spondylosis, Frozen Shoulder, Low backache, Knee Osteoarthritis, etc. by the certain clinical diagnostic features such as Region of pain, Tenderness and stiffness, Radiation, Range of motion, Aggravating factor, Relieving Factor, Occupation, and Specific Clinical test related to different diseases performed accordingly and Radiological examination was also done. Investigations as safety parameters like Haemogram, Bleeding time (BT), Clotting time(CT), Erythrocytes Sedimentation Rate (ESR), and Random Blood Sugar (RBS) Records were maintained on a prescribed proforma which was designed according to the objectives of the study.

2.2. Screening

A total of 110 subjects were screened among them 100 subjects were found eligible for the study. Ten subjects refused to participate in the study. Ninety subjects enrolled in the study. Selected subjects were allocated to the test regimen (*Hijama bil shurt*), and thirty subjects were lost to follow-up. Thus, 60 subjects completed the study [Figure 1].

2.3 Therapy Procedure & Assessment Period

The study participants were given four sittings of *Hijama Bil Shurt* Therapy weekly. After all the necessary antiseptic measures, the site chosen for the application of hijama cups was disinfected via betadine lotion. Four to Six cups were applied to the tender points or at the nerve root level of the required selected area of the skin according to the nature of different musculoskeletal disorders by using a suction pump. During each sitting, before starting the procedure, vitals were recorded. The method of *Hijama* was **Primary sucking**: The sterilized cup is placed on the selected site and the negative pressure is created through the manual suction pump. The cups will remain placed for a period of 10 minutes or till the appearance of erythema and congestion, the cups will be then removed. **Scarification**: Multiple superficial incisions are made on the cupped area by using a sterile surgical blade 11 number. The cups coated with K3EDTA will be reapplied on the selected points for a period of 5 minutes. The cup blood

was assessed for the presence of inflammatory markers (CRP & S. Uric acid). After the procedure the site was dressed with antiseptic lotion and Patients had been advised to remove the dressing after 24 hours.

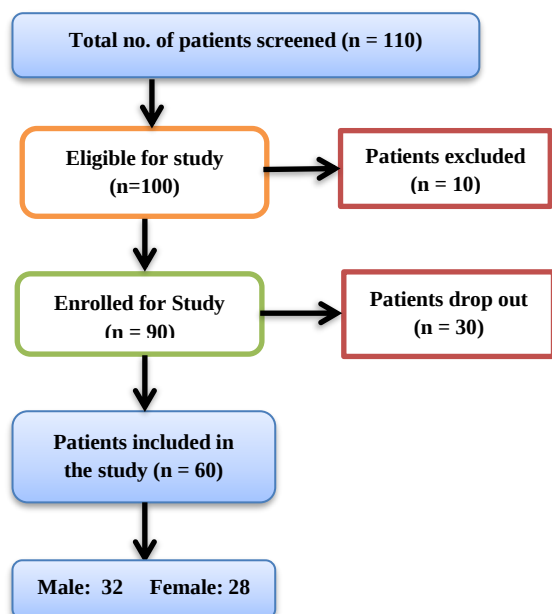


Figure 1: CONSORT chart of study procedure inclusion criteria

Visual Analogue Scale (VAS): It is a 10cm numerical scale comprised of 0-10cm, where '0' represents no pain and 10 represents worst pain. As the numerical value of the scale increases the magnitude of pain also increases respectively. Further, this scale allows categorical consideration of pain intensity in terms of grades. Grade 0 (None), Grade 1 (Mild 1-3), Grade 2 (Moderate 4-6), and Grade 3 (severe 7-10).

Knee injury and Osteoarthritis Outcome Score (KOOS): This is a self-reported outcome measure assessing the patient's opinion about the health, symptoms, and functionality of their knee. It is a 42-item questionnaire, including 5 subscales: symptoms, pain, ADLs (activities of daily life), sports/ recreation, and quality of life. Grading: 0=Absent, 1=Mild, 2=Moderate, 3=Severe.

The haematological assessment has been done based on secondary outcome parameters i.e. CRP and Serum Uric acid by taken 5ml venous blood to assess the inflammatory marker (CRP and S. Uric acid) before the procedure and 5ml *Hijama* cup blood accumulated during the procedure at each sitting to compare the change in cupped blood and venous blood for the inflammatory marker (CRP and S. Uric acid). **Follow-ups** every week for the 0th, 14th, 21st, and 28th days were made and the outcomes were measured by improvement in subjective and objective (assessment) parameters.

Withdrawal criteria, were Failure to follow protocol therapy, the case in which adverse reaction is noticed (if any), and Patients not willing to sign the informed consent.

Table 1: Application of *Hijama* cups in different Musculoskeletal disorders

S.No.	DISEASE	No. of Sitzings	No. of Cups	Size of Cups	Site of Cups
1	Cervical Spondylosis	4	5	Medium	1 at C7 vertebra (Nuqra), 2 at Right & left supra-clavicular fossa (Katifain), 2 on both scapular- region
2	Frozen Shoulder	4	4	Medium	2 at anterior & lateral aspect of shoulder girdle, 1 at katifain (affected- side), 1 on scapular region (affected- side)
3	Low backache	4	4	Medium	over the lateral aspect of lumbosacral region (<i>Al-warak</i>).
4	Knee Osteoarthritis	4	4	Medium	Super-anterior, medio-lateral aspect of both knee joint
5	Sciatic pain	4	6	Medium	2 at the lateral aspect of lumbosacral- region, 4 cups on the course of sciatic- nerve
6	Rheumatoid arthritis	4	5	Medium	Sunnah points, 1 at C7 vertebra (Nuqra)- 2 at Right & left supra-clavicular fossa- (Katifain), 2 at the- lateral aspect of- lumbosacral region(<i>Al-warak</i>)
7	Gout	4	4	Small & Medium	2 Small cups at medial aspect of ankle on both feet (<i>Zahr al qadami</i>), 2 medium cups on bilateral calf muscles.

2.4. Adverse Reaction Documentation

Any adverse event or reaction that occurred during the study was documented. The case record forms and consent forms were submitted to the department of *Ilaj-Bit-Tadbeer* after the completion of the study.

2.5. Safety Assessment

The safety of the treatment is assessed by clinical assessment at every visit of follow-up (7th,14th, 21st, and 28th day), Hematological assessment before and after treatment

(Hemoglobin, Total Leukocytes Count, platelets, Bleeding time, clotting time, Erythrocyte Sedimentation Rate, RBS).

2.6. Statistical Analysis

Statistical analysis was done on all the patients (N=60). Statistical software namely G-pad was used for the analysis of the data and Microsoft Word and Excel were used to generate graphs, tables, etc. Results on continuous measurements were presented on Mean $\pm$ SD and results on categorical measurements were presented in Number (%). Significance is assessed at a 5 % level of significance.

3. RESULTS

3.1. Participant enrolment and characteristics

Our study population comprised predominantly of males 53.3% (32) while the remaining 46.7% (28) were females. In this study, the maximum number of subjects 46.7% (28) was in the age group of 40–50 years. At the commencement of the study, the demographic data of subjects with complaints of musculoskeletal pain is shown in Table 2.

Table 2: Demographic profile of study participants

AGE		
20-30 Y	17	28.3%
30-40 Y	15	25%
40-50 Y	28	46.7%
GENDER		
Male	32	53.3%
Female	28	46.7%
RELIGION		
Muslim	51	85%
Non-Muslims	9	15%
MARITAL STATUS		
Married	45	75%
Unmarried	15	25%
DIETARY HABITS		
Non-Veg.	51	85%
Veg.	9	15%
MIZAJ (Temperament)		
Balghami	38	63.3%
Damvi	16	26.7%
Safravi	3	5%
Saudavi	3	5%

3.2. Efficacy Assessment

Efficacy assessment made based on the primary outcome (VAS & KOOS) and secondary outcome (S. Uric & CRP). Among sixty patients in the study there were different musculoskeletal disorders in different numbers were observed such as Cervical Spondylosis, Frozen Shoulder, Low Backache, Sciatic pain, and Knee Osteoarthritis, containing 50 (83%) i.e., 10 patients for each disorder. In the case of Gout and Rheumatoid Arthritis, 10 (17%) patients were included, i.e., 5 patients (8.5%) for each. All patients were assessed for pain and managed with *Hijama-Bil-Shurt* (Wet Cupping) for 28 days. After 28 days of intervention based on the VAS score the observed mean values for pain relief in every 10 cases of cervical spondylosis, Frozen shoulder, Low Backache, and Sciatic pain, were 7.9 ± 0.73 vs. 3.8 ± 0.63 , 7.8 ± 0.6 vs. 3.7 ± 0.6 , 7.4 ± 0.6 vs. 3.8 ± 0.4 , 8 ± 0.6 vs. 3.8 ± 0.6 and based on KOOS score in 10 cases of Knee osteoarthritis the mean value for pain relief was 46.1 ± 3.5 vs. 65.4 ± 1.5 respectively. Based on the VAS score the observed mean values for Pain relief in each 5 cases of Gout and Rheumatoid arthritis were 8.2 ± 0.8 vs. 4.0 ± 0.7 and 7.6 ± 0.5 vs. 3.6 ± 0.8 respectively. After 28 days of intervention, the improvement was suggestively significant from the baseline in all the considered musculoskeletal conditions which indicates the effect of *Hijama-Bil-Shurt* on painful musculoskeletal disorders [Table-3].

3.3. Haematological Assessment

The mean values for uric acid in venous blood were 5.67 ± 0.8 vs. 5.63 ± 0.6 at the baseline and 28th day respectively. The t-value observed at the end of treatment was 1.4 which is suggestively not significant. Similarly, for serum uric acid in cupped blood, the mean values in cup blood were 2.8 ± 2.0 vs. 2.6 ± 1.6 at baseline and 28th day respectively. The t-value observed at the end of treatment was 3.7 which is suggestively significant. The mean values for CRP in venous blood were 3.4 ± 0.9 vs. 3.2 ± 0.8 at baseline and 28th day respectively.

Table 3: Effect of *Hijama-Bil-Shurt* on painful musculoskeletal conditions

Musculoskeletal Conditions (n)	Baseline	14 th day	28 th day	P-Value	T- Value	Level of significance
Cervical Spondylosis (n=10)	7.9 ± 0.73	6.6 ± 0.51	3.8 ± 0.63	<0.0001	17.57	Significant
Frozen Shoulder (n=10)	7.8 ± 0.6	6.6 ± 0.5	3.7 ± 0.6	<0.0001	22.8	Significant
Low Backache (n=10)	7.4 ± 0.6	6.2 ± 0.6	3.8 ± 0.4	<0.0001	11.7	Significant
Sciatic Pain (n=10)	8 ± 0.6	6.9 ± 0.5	3.8 ± 0.6	<0.0001	16.8	Significant
Knee Osteoarthritis (n=10)	46.10 ± 3.5	56.5 ± 2.87	65.40 ± 1.50	<0.0001	17.9	Significant
R. Arthritis (n=5)	7.6 ± 0.5	6.2 ± 0.4	3.6 ± 0.8	0.002	12.6	Significant
Gout (n=5)	8.2 ± 0.8	6.6 ± 0.5	4.0 ± 0.7	0.001	8.5	Significant

The t-value observed at the end of treatment was 11.4 which is suggestively significant. Similarly, for CRP in cup blood, the mean values were 1.9 ± 0.5 vs. 1.6 ± 0.5 at baseline and 28th day respectively. The t-value observed at the end of treatment was 14.1 which is suggestively significant. A comparison between venous and cup blood samples for Serum uric acid was done, An Unpaired t-test was used for statistical analysis showing results at a 5% significance level and the t-value observed at the end of treatment was 2.9 on the 7th day and 28th day respectively. which is suggestively significant. Similarly, for comparison of CRP in venous & cup blood, Unpaired t-test was used for statistical analysis showing results at a 5% significance

level and the t-value observed at the end of treatment was 1.5 on the 7th day and 28th day respectively. which is suggestively not significant [Table 4].

3.4. Safety and Tolerability

During the course of the study, no adverse events were reported. It was found that all the safety parameters were within the normal range after completion of the trial. Patients reported good tolerability of *Hijama Bil shurt* therapy. This suggests that the *Hijama Bil shurt* is safe and very well tolerated.

4. DISCUSSION

The management of pain (*Waja*) has been a medical jargon ever since and more so now, due to various co-existing morbidities and adverse reactions of painkillers prevailing in the present time. The pain-causing musculoskeletal disorders impose a heavy burden of human suffering on individual families and have enormous direct and indirect constraints on

the activities of daily life. Since most of the anti-inflammatory drugs of modern medicine have significant adverse effects. *Unani* Medicine offers various non-pharmacological treatments to bring remission in symptoms to a greater extent and this type of treatments comes under, *Ilaj Bit- Tadbeer* (regimenal therapy), which is an important mode of treatment in the *Unani* system of medicine and has various modalities with unique approaches for a vast variety of diseases.

Table 4: Comparative Haematological Study of the Venous & Cup Blood

First PARA- METER	VENOUS BLOOD		T and P- value intra-group- PAIRED t-test	CUPPED BLOOD		T and P- value intra-group- PAIRED t-test
	MEAN ± S.D			MEAN ± S.D		
	BEFORE	AFTER		BEFORE	AFTER	
SERUM URIC ACID	5.67 ± 0.8	5.63 ± 0.6	T stat = 1.4 P-value = 0.15 PAIRED t-test	2.8 ± 2.0	2.6 ± 1.6	T stat = 3.7 P-value = 0.004 PAIRED t-test
T and P-value inter- group UNPAIRED t- test	T stat = 2.9 & P-value = 0.004 [Statistically Significant]					
Second PARA- METER	VENOUS BLOOD		T and P- value intra-group- PAIRED t-test	CUPPED BLOOD		T and P-value intra- group-PAIRED t-test
	MEAN ± S.D			MEAN ± S.D		
	BEFORE	AFTER		BEFORE	AFTER	
C-Reactive Protein	3.4 ± 0.9	3.2 ± 0.8	T stat = 11.4 P-value = <0.001	1.9 ± 0.5	1.6 ± 0.5	T stat = 14.1 P-value = <0.001
T and P-value inter- group UNPAIRED t- test	T stat = 1.5 & P-value = 0.12 [Statistically not significant]					

Keeping this in view, the present study was designed to explore the *Hijama Bil Shurt* therapy scientifically. In this study, *Hijama Bil shurt* was found to be superior in reducing pain in many different musculoskeletal disorders after 28 days of intervention.

4.1. Effect on VAS (In different painful musculoskeletal conditions)

In the current study, VAS for pain in the different musculoskeletal disorders at baseline data compared with post-treatment data after 28 days of intervention, among the musculoskeletal disorders enrolled in the study. A significant reduction was observed in VAS Score from baseline as, 7.9 $\pm$ 0.73 vs. 3.8 $\pm$ 0.63 in the case of cervical spondylosis, 7.8 $\pm$ 0.6 vs. 3.7 $\pm$ 0.6 in the case of frozen shoulder, 7.4 $\pm$ 0.6 vs. 3.8 $\pm$ 0.4 in case of Low backache, 8 $\pm$ 0.6 vs. 3.8 $\pm$ 0.6 in case of sciatic pain, 8.2 $\pm$ 0.8 vs. 4.0 $\pm$ 0.7 in case of gout, 7.6 $\pm$ 0.5 vs. 3.6 $\pm$ 0.8 in case of rheumatoid arthritis. The results came out statistically significant ($p < 0.0001$) [Table 3]. This shows that the test therapy (*Hijama-Bil-Shurt*) is effective in controlling the pain in different musculoskeletal disorders and quality of life significantly improved in the enrolled cases of musculoskeletal disorders. The observations are in conformance with a previous study done by Nafeesa et.al. reported that *Hijama* enhances the dilution, diversion, and evacuation of morbid humor, increases blood circulation, increases many growth factors, and thereby promotes the reparative process (healing process). One of the major effects of *hijama* is to influence the lymphatic system, hence increasing lymph flow. Due to this is deemed an effective mode of treatment in a wide range of chronic painful musculoskeletal conditions.²⁰

4.2. Effect on KOOS score in Knee Osteoarthritis

In this study, the pain due to knee osteoarthritis was between mild to moderate i.e. mean score of KOOS at baseline was 46.10 $\pm$ 3.5 (Mean $\pm$ S.D) which was reduced to 65.40 $\pm$ 1.50 after treatment. The observation came out statistically significant ($p < 0.0001$) [Table 3]. This shows that test therapy (*Hijama-Bil-Shurt*) is effective in controlling the pain in case of knee osteoarthritis and quality of life is significantly improved in such cases. In a study, Lee-Mei Chi et.al. reported The pulling effects or negative pressure during *hijama* helps in stimulation of the parasympathetic nervous system which leads to decreased blood pressure, stress, anxiety, and depression. Which are proven to increase pain sensitivity and raise the pain threshold. During scarification in *hijama*, there is a release of natural analgesic endorphins (endogenous morphine) which block the pain gate in the spinal cord raise the - threshold of pain, and play an important role in the management of pain. It also activates the acupuncture and acupressure points that stimulate the production of endorphins which helps to control pain and mood elevation.²¹ In a study done by Abdullah M.N.et.al. reported that pain reduction due to cupping therapy can also be explained in terms of biomechanical properties of the skin and accumulation of blood (plethora) could be explained by pain gate theory, diffuse noxious inhibitory control (DNICs) i.e. pain induction (*elaam*), and reflex zone theory, previously described in review literature. Muscle relaxation, specific changes in local tissue structures, and increased blood circulation could be explained by a release of Nitric oxide(NO) theory. This affects two aspects of oxygen and demand: it regulates vascular tone and blood flow by activating soluble guanylate cyclase enzyme in the vascular smooth muscle, and it controls mitochondrial oxygen consumption by inhibiting cytochrome oxidase.²²

4.3. Effect of Hijama Bil Shurt on S. Uric acid

The baseline data for serum uric acid level in venous blood compared with post-treatment data after 28 days of intervention, the mean values were observed (Mean $\pm$ S.D) 5.67 ± 0.8 vs. 5.63 ± 0.6 respectively. Which is suggestively insignificant, this indicates the test therapy (*Hijama-Bil-Shurt*) was not effective in reducing the serum uric acid in venous blood. Similarly, serum uric acid level in cup blood sample after 28 days of intervention. The mean value for uric acid in cup blood at baseline was 2.8 ± 2.0 vs. 2.6 ± 1.6 at 28th days. This shows the *Hijama-Bil-Shurt* therapy was effective in reducing the serum uric acid level in a cup blood sample.

4.4. Effect of Hijama Bil Shurt on C-Reactive Protein

On the analysis of data, the mean value for CRP in venous blood at baseline was 3.4 ± 0.9 vs. 3.2 ± 0.8 on the 28th day respectively. This shows the *Hijama-Bil-Shurt* was quite effective in reducing the CRP level in venous blood.

Similarly, the CRP level in the cup blood sample the mean value at baseline was 1.9 ± 0.5 vs. 1.6 ± 0.5 on the 28th day respectively. This shows the *Hijama-Bil-Shurt* was quite effective in reducing the CRP level in cup blood.

4.5. Comparison between venous and cup blood sample

To compare the venous and cup blood samples for the given assessment parameters i.e. Uric acid and CRP. Differences between the baseline and post-treatment data for venous as well as cup samples have been taken and analyzed.

On the analysis of data, a significant difference appeared for serum uric acid with a t-value >2 and a P-value of 0.004 in the unpaired t-test. Similarly, CRP was also evaluated in both samples, i.e. venous and cup blood before and after the wet cupping therapy. On the analysis of data of difference between pre and post-sample, the insignificant difference appeared for CRP with t-value <2 and P-value 0.12 in unpaired t-test. The observations are in conformance with a previous study done by Abdulsattar et.al. reported that *Hijama* creates local inflammation that leads to the attraction of neutrophils and macrophages. which helps in the activation of the immune system by acting on the reticuloendothelial system, a complementary system to help it oppose the actions of invading microbes. It enhances the dilution, diversion, and evacuation of morbid humor and disease-causing pathological substances like prostaglandins, interleukins, cytokines, substance-p, etc. from the human body.²³ Mohammad Reza Vaez et.al. reported the valuation of the effects of traditional cupping on the biochemical, hematological and immunological factors of human venous blood; a compendium of essays on an alternative therapy. It increases blood circulation and thereby promotes the reparative process (healing process) by clearing out the blockage of lymphatic and venous congestion by negative suction pressure and removes hypoxia by increasing the nutrition and oxygen supply to the cells and tissue. One of the major effects of *hijama* which is deemed an effective mode of treatment in a wide range of diseases is the stimulation of the lymphatic system.²⁴ Zuhair Rishdi Mustafa et.al. reported that there is a release of a chemical substance named nitrous oxide (NO) during *hijama* which helps in the formation of new blood vessels (angiogenesis) and dilatation of blood vessels that lead to decreased blood pressure and remove metabolic waste and increase the healing process. *Hijama* removes the metabolic waste (*fasid madda*) at higher pressure both hydrophilic and hydrophobic while the kidney removes only hydrophilic waste at lower pressure that is why *hijama* is also known as another kidney/ artificial percutaneous route of excretion/ minor surgical excretory method. In *Hijama*, no medicine is introduced rather removing the disease-causing

substance, inflammatory mediators, and heavy metals through the skin by breaking the barriers by making incisions, so *hijama* is known as detoxification therapy, which is helpful to normalize and maintaining homeostasis.²⁵ The present study is contradictory to the common belief that the *Hijama Bil shurt* (wet cupping) decreases the hemoglobin level. And, it supports the *Unani* texts claiming *Hijama* increases the production of fresh blood (Haemopoiesis). As per the clinical records and results, test therapy i.e. *Hijama Bil Shurt* (wet cupping) appeared safe with no adverse effects.

5. CONCLUSION

Hijama Bil Shurt (Wet cupping), has been found effective for pain management of musculoskeletal origin as it causes dilution, diversion, and evacuation of morbid humours. (Disease-causing pathological substances and inflammatory mediators like prostaglandins, cytokines, interleukine, and substances-P). Wet cupping therapy was not found effective in reducing the raised serum uric acid in venous blood after the completion of the study. During subsequent sittings of *Hijama Bil Shurt* therapy, serum uric acid was found to be reduced gradually in cup blood in comparison to the initial sample. CRP level was also found to be reduced gradually in both venous and cup blood samples in comparison to the initial sample. The results of the present study might be limited due to the small sample size and the absence of a control group. Therefore, to substantiate the findings of the present study, it should be done on a larger sample size and larger funding source. In conclusion, it can be inferred from the present study that *Hijama Bil Shurt* helps treat painful musculoskeletal conditions without any adverse effects.

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Conflict of Interest:

The authors declare that there is no conflict of interest.

Ethical Statement:

This study was approved by the Institutional Ethics Committee for Biomedical Research of Ajmal Khan Tibbiya College & hospital, Faculty of *Unani* Medicine, AMU, Aligarh, India vide no. 340/FUM.

Data availability:

All the data analysed in this study were included in this article. Further inquiries can be directed to the corresponding authors.

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